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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,030	10/29/2001	Joseph H. Jackson III	LJL 367	1206

20306 7590 12/28/2004

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EXAMINER	
SUNG, CHRISTINE	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/003,030	JACKSON ET AL.	
	Examiner	Art Unit	
	Christine Sung	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2004*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17,19-33 and 35-76* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *69-76* is/are allowed.

6)☒ Claim(s) *1,2,4-8,10-13,17,19-26,28-30,32-39 and 41-66* is/are rejected.

7)☒ Claim(s) *3,9,14-16,27,31,40,67 and 68* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. The amendment filed on 10/01/2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-2, 4, 6-8, 10, 12-13, 17, 19-24, 28-30, 32-33, 35-39 and 41-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh (US Patent 5,938,617) in view of Li (US Patent 6,759,662).

Regarding claims 1 and 28-29, Vo-Dinh discloses in figure 2, a light source (element 22) with certain first wavelength (Column 5, lines 14-15); a wavelength converter (element 26) configured to receive the light of the first wavelength to convert that light into light of a second wavelength, where the second wavelength is different than the first wavelength (Column 5, lines 18-19); a system for directing the light of the second wavelength to an examination area (see

figure 2, elements 28, 30, 32, and 34); a detector (element 38) configured to receive luminescence light from a sample positioned in the examination area (Column 5, lines 31-32). However, Vo-Dinh does not disclose an optical pattern generator configured to convert the light of the second wavelength into light having a pre-selected intensity pattern and an optical relay structure configured to project the light having the pre-selected pattern onto the examination area, where the projected pattern conforms to the arrangement of the sample sites. Li discloses an optical pattern generator or pinhole array (figure 4, element 44) that converts incident light into a pattern, and an optical relay structure or lens (element 52) configured to project the light having the preselected pattern onto the examination area (element 62), where the projected pattern substantially conforms to the arrangement of sample sites (see figure 4, elements 64 with pinholes). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the system for directing light as disclosed by Li with the invention as disclosed by Vo-Dinh in order to reduce the amount of spurious radiation impinging upon the examination area which decreases the accuracy by increasing the detection of erroneous data.

Regarding claim 2, Vo-Dinh further discloses that the light source can be a pulsed laser (element 22, column 5, lines 16-17).

Regarding claim 4, Vo-Dinh does not specifically disclose discarding data corresponding to a first set of laser pulses. However it is well known in the art that a warming up mode may be used to warm up the laser by pulsing it and taking measurements so that during operation the laser provides a uniform and consistent pulse throughout measurement. It is customary to include a trial run where the apparatus is given time to properly warm up and calibrate itself. Therefore it

would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a trial run where the first set of data is collected and discarded.

Regarding claim 6, although Vo-Dinh does not specifically disclose the use of a YAG laser, this type of laser is well known in the art. Therefore it would have been obvious to one having ordinary skill in the art at the time then invention was made to have used this specific type of laser as it is only a matter of design choice.

Regarding claim 7, Vo-Dinh discloses that the wavelength converter may include an optical parametric oscillator.

Regarding claims 8 and 30, Vo-Dinh discloses the conversion of the light from a first to a second wavelength, but does not disclose a conversion from the second to a third wavelength. Because Vo-Dinh discloses a wavelength converter for converting the light from a first to a second wavelength, the conversion of the light to a third wavelength would have been obvious to one having ordinary skill in the art at the time the invention was made because Vo-Dinh discloses converting light from wavelength A to C, and thus having another wavelength converter that converts wavelength from A to B to C would still arrive at the same wavelength. Further, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman,* 168 USPQ 177, 179 (BdPatApp&Int 1969).

Regarding claims 10 and 12, Vo-Dinh does not specify discarding the light of a third wavelength. However it is well known in the art to discard wavelengths not used or necessary for detection. Further the discarded wavelengths are typically directed away from the detector or can be absorbed in order to remove the undesired wavelengths. Therefore it would have been

obvious to one having ordinary skill in the art at the time the invention was made to have discarded undesirable wavelengths in order to reduce the erroneous readings that could result from exposure from undesirable radiation.

Regarding claim 13, Vo-Dinh further discloses a wavelength selector or laser dye unit for selecting the second wavelength (see figure 3, and column 5, line 54-column 6 line 2).

Regarding claim 17, Li discloses a beamsplitter (element 50) for directing light.

Regarding claims 23-24, Vo-Dinh discloses that the detector is an imaging detector that could be a CCD (column 7, lines 20-23).

Regarding claim 19, Li discloses a sample holder (figure 4, element 62) with a series of spots in an array (Figure 4, element 64) or a microplate.

Regarding claims 20-21 and 59-60 Vo-Dinh discloses a first path that is defined by an optical fiber (element 88) and a second path that is defined by another optical fiber (element 94). Although he does not specify the orientation of the paths with respect to each other, optical fibers can be constructed to be oriented in whatever configuration necessary. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have oriented the paths either anti parallel or parallel to each other, since it only involves routine skill in the art to position the fibers into desired positions.

Regarding claim 22, Li discloses that substantially all the light in the projected pattern is incident on the sample sites (see figure 4).

Regarding claim 26, Vo-Dinh in view of Li discloses the limitations set forth in claim 1, but does not specify a fluid deliver system with a dispensing device configured to deliver a fluid material to the sample. However Li discloses that the sample (Figure 4, element 62) in capillary

channels, which inherently is liquid because the sample undergoes electrophoresis, the separation of particles by charge or weight through the liquid. Therefore it is obvious that the sample was dispensed by means of a delivery system to the sample.

Regarding claims 32 and 63, Vo-Dinh discloses that the sample includes a luminescent material that is responsive to incident radiation. Further since the sample includes objects such as organs or other cellular materials, the emission radiation from the sample is indicative of properties relating to the organ, i.e. tissue density. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have correlated the emitted light to a property of the sample, i.e. tissue density (see abstract).

Regarding claims 33 and 41-43 it is an inherent property of luminescence that illumination of a phosphor and detection of the luminescence is time dependent, meaning that the illumination of the sample results in an emission of light that decays over a period of time. Therefore the light is used to determine a time dependent property of the sample. Further, it is an inherent property of luminescence that there is an excited state lifetime for the phosphor in the sample.

Regarding claim 35, Li discloses that the projected pattern of the optical generator substantially conforms to the arrangement of the sample sites (see figure 4, elements 44 and 64)

Regarding claim 36, Vo-Dinh discloses directing the second wavelength light onto the sample (see figure 2); measuring the light from the sample (see figure 2, element 38); correlating the light from the sample with a characteristic of the sample (see abstract).

Regarding claims 37 and 38, Vo-Dinh discloses measuring the sample or organ in one reading, thus the entire sample is measured all at once. Therefore it would have been obvious to

one having ordinary skill in the art at the time the invention was made to have had a divided sample where the sample is measured all at once as it would only be a matter of design choice to use a divided sample holder.

Regarding claim 39, it is an inherent property of luminescence that illumination photochemically activates the sample component and Vo-Dinh discloses a luminescence detection system.

Regarding claims 44 and 61-62, Vo-Dinh discloses a light detection device (see figure 2) comprising a light source (element 22) configured to produce light capable of exciting luminescence and a detector (element 38) configured to receive luminescence light from a sample. However, Vo-Dinh does not disclose an optical pattern generator configured to convert the light of the second wavelength into light having a pre-selected intensity pattern and an optical relay structure configured to project the light having the pre-selected pattern onto the examination area, where the projected pattern conforms to the arrangement of the sample sites. Li discloses an optical pattern generator or pinhole array (figure 4, element 44) that converts incident light into a pattern, and an optical relay structure or lens (element 52) configured to project the light having the preselected pattern onto the examination area (element 62), where the projected pattern substantially conforms to the arrangement of sample sites (see figure 4, elements 64 with pinholes). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the system for directing light as disclosed by Li with the invention as disclosed by Vo-Dinh in order to reduce the amount of spurious radiation impinging upon the examination area which decreases the accuracy by increasing the detection of erroneous data.

Regarding claim 45, Vo-Dinh further discloses that the light source can be a pulsed laser (element 22, column 5, lines 16-17).

Regarding claim 46-47, Li further discloses that the optical pattern generator includes a diffractive element or a lens (Figure 4, element 52).

Regarding claim 48, although Vo-Dinh in view of Li does not specify the use of a fold mirror in the optical relay structure, Li does disclose an optical relay lens (figure 4, element 52). One of ordinary skill in the art would have been motivated to use a fold mirror over a conventional lens because it is well known in the art that these are equivalent optical relay structures.

Regarding claim 49, Li discloses that the optical pattern generator (element 44) is substantially periodic (see pinhole array).

Regarding claim 50, it is inherent that the light source used will cause fluorescence, as Vo-Dinh discloses a fluorescence sensor, therefore the light projected through the pattern inherently projects light capable of inducing luminescence.

Regarding claim 51, Li discloses that the projected pattern comprises an array of spots (see Figure 4, element 44).

Regarding claim 52, Li discloses a pinhole optical pattern generator (element 44), that inherently projects uniform light through each pinhole, as the light source is a uniform light source (element 46) which is filtered through a beamsplitter (element 50) and is passed through a pinhole array (element 44) to deliver a uniform intensity within each pinhole to the sample array.

Regarding claims 53-56, the type, number or divisions of the sample holder are within the scope of accepted or analogous sample holders that are well known in the art. Therefore it would

have been obvious to one having ordinary skill in the art at the time the invention was made to have used a biochip, a selected sample division or a microplate.

Regarding claims 57-58, Vo-Dinh discloses that the detector is an imaging detector that could be a CCD (column 7, lines 20-23) that receives luminescence from the sample (see figure 2).

Regarding claims 64-66 it is an inherent property of luminescence that illumination of a phosphor and detection of the luminescence is time dependent, meaning that the illumination of the sample results in an emission of light that decays over a period of time. Therefore the light is used to determine a time dependent property of the sample. Further, it is an inherent property of luminescence that there is an excited state lifetime for the phosphor in the sample.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh (US Patent 5,938,617) in view of Li (US Patent 6,759,662) further in view of Spangenberg (US Patent 5,973,842).

Vo-Dinh in view of Li discloses the limitations set forth in claim 1, but he does not disclose the use of a reference beam monitor. However, it is well known in the art to have a reference beam to monitor any fluctuations, which could denote errors in the laser or light source being used. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a reference beam monitor, like the one disclosed in Spangenberg (Column 26, lines 56-59) in order to ensure that the radiation coming from the source is consistent between measurements or during readings.

6. Claims 11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh (US Patent 5,938,617) in view of Li (US Patent 6,759,662) and further in view of Stone et al. (US Patent 5,477,332).

Regarding claim 11, Vo-Dinh in view of Li does not specify the use of a spectral filter to discard unwanted radiation. It is well known in the art and further, is demonstrated by Stone, that spectral filters are used to reduce and eliminate unwanted radiation. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a spectral filter to remove unwanted radiation to increase the accuracy of the desired measurements and decrease the possibility of erroneous measurements.

Regarding claim 25, the limitations set forth in claim 1 have been disclosed in the abovementioned paragraphs. Vo-Dinh does not specify the use of a spectral filter to preferentially block light of the first wavelength and substantially transmit light of the second wavelength. However it is well known in the art to use spectral filters to allow desired radiation spectra to pass to the sample of interest. For example, Stone et al. discloses an imaging system including a spectral filter for restricting radiation to a desired radiation spectrum (column 5, lines 55-58). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a spectral filter to prevent radiation of an undesired spectrum to reach the sample or detection unit.

Response to Arguments

7. Applicant's arguments with respect to claims 1-2, 4-8, 10-13, 17, 19-26, 28-30, 32-39, and 41-66 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claims 3, 9, 14-16, 27, 31, 40, 67-68 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 69-76 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter:

The allowable subject matter for claims 3, 9, 14-16, 27, 31, 40 and 67-66 were disclosed in the previous office actions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christine Sung

Examiner
Art Unit 2878

CS

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